

# Invisible Ivory Keytop Replacement

## Basic Step-by-Step Procedures



Key Work

By Chuck Behm

## Invisible Ivory Keytop Replacement



### -Rationale-

Having the capability to offer a variety of services when it comes to the keyboards of customers' pianos is the hallmark of a full-service piano shop. At times, when the mission is simply to get a piano "up and running," a quick on-the-spot filling in of missing ivories might be the order of the day. On other occasions, when old ivory is too far gone to rescue and a nice appearance and even touch are desired, a professionally done replacement with molded keytops might be more in line with the needs of the customer.

On those occasions when a vintage piano has genuine ivory in decent condition but in need of work (such as in the photo above), the technician should be able to offer a restoration service in which the existing ivory is retained and put in good condition again, and missing ivory is replaced in a way that is invisible to all but the trained eye. (See cover photo for the after shot of the above keyset.)

Properly done, the restoration of an ivory keyset can result in a beautiful keyboard. It is, however, necessary that exacting processes be followed in order to achieve satisfactory results. Poor workmanship (which one unfortunately sees evidence of far too often in the field) will not do a piano or the technician justice.

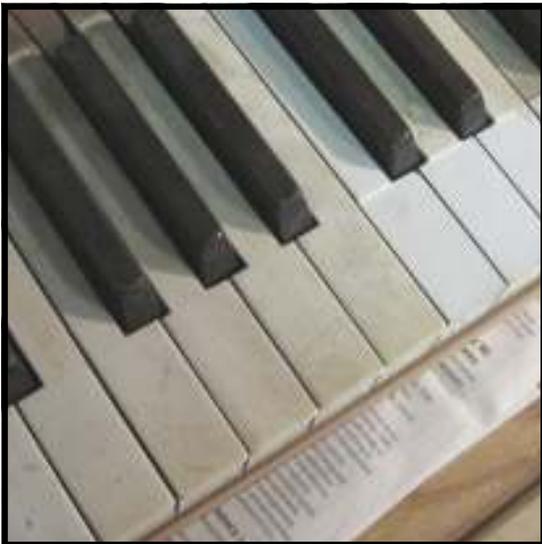
## Ellington upright

## Key Work / Invisible Keytop Replacement



**Know when to hold them, when to fold them, and when to walk away.\*** Sometimes, there's not enough of the original ivory in good condition to make a proper keytop restoration project feasible. If the large majority of ivories are unusable, a more practical option (unless one has a huge collection of replacement ivories to draw from) would simply be to resurface a customer's keys with molded keytops or to contact Schaff for their recovering services.

**\*apologies to Kenny Rogers**



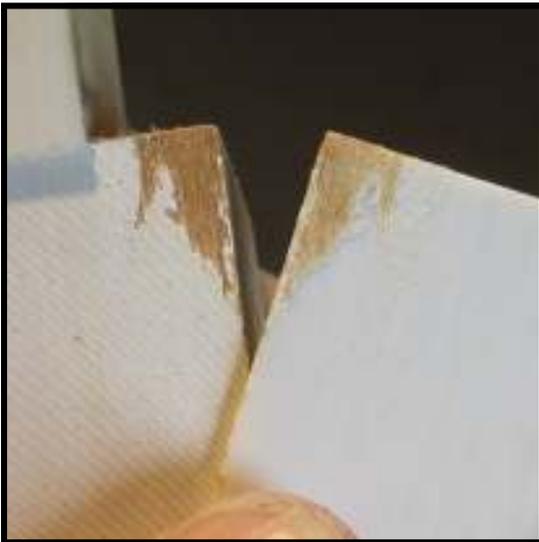
**Go Green! A keyboard such as this would be a prime candidate for a restoration project. Since quite a few of the original ivories are still in place and some of the detached ivory is still to be found, the number of keys which need replacement ivory is reasonable, thus increasing the likelihood attaining a satisfactory result. By restoring the old set of ivory keys, one is making use of an increasingly rare product and is being environmentally responsible.**



**Step 1:** Search for missing ivory. You will be much better off if you have the original ivories than if you are forced to find replacement keytops to fill in. Take the time to search the dusty nether regions under the keys, in that ivories that come loose often end up being slipped in between the keys. Check the piano bench and of course ask the owner if any ivories have been put away in a drawer somewhere. Each keytop that is thus located may be returned back to its rightful spot on the keyboard.



**Step 2a:** For original head pieces of ivory which have been located, attempt to find the spot of origin for each. Begin by checking the back of the ivory for filing marks. This is a good starting point, in that you can usually distinguish this way between notes. C's and F's will look nearly the same (an F's notch is a shade wider than a C's), as will the B's and the E's. D's, G's and A's are different enough that one can easily tell them apart. (The key at left is a D.)



**Step 2b:** If several ivories of the same note have been located (such as more than one G, for example), you can sometimes spot which keytop goes where by checking the underside of the ivory for clues. Patches of fabric or wood adhering to the ivory will sometimes give enough of a clue to help you find the exact spot where the keytop should go.



**Step 2c:** Finally, the amount of wear on the leading edge of the key can be a clue as to its proper location. An A key from the center of the keyboard, for example, will likely have more wear evident than an A key which comes from the either the bass or the treble end. The key on the right, which was an A4, has considerably more wear than the one on the left, which was an A1. *Notice the more translucent front edge.*



**Step 3:** Once the correct location for a keytop has been determined, place that top on the correct key for the time being so that you can turn your attention to filling in the rest of the gaps.



**Step 4:** When all existing keytops have been returned to their rightful spots, take inventory as to which notes will need replacement keytops. Keys which will need replacing will include:

- keytops missing altogether.
- keytops in place, but which are chipped, cracked, or badly worn.
- keytops which have been previously replaced with bad matches.

In the example photo, only the F and the B are salvageable. G is missing, A is too short, and C is chipped.



*Note: If this resembles your collection of ivory, you may not be able to complete an extensive job. Again, always save good ivory when recovering keys with plastic.*

***Advisory Caution:***

*Before proceeding any further on this course of action, take a realistic look at your existing collection of used ivories. If it is particularly small, you may not be able to find enough suitable replacements to do a professional looking job. Advise your client of the situation, and look at your options carefully. If nothing else, allow the customer to be in on the selection process. Your collection should be considerably larger than the number of ivories needing replacement.*



**The many variations in ivory:**  
*Variations in keytops often make the finding of exact matches for missing ivories difficult, even when one has a large collection of used ivory. Keytops in a variety of shades. Ivory needs the bleaching action of sunlight to remain white. Keys that have been shut away from the sun for decades will often have turned yellow. Although keys may be somewhat rewhitened, look for the closest shade to the original as possible.*



*A difference in the amount of grain between ivories will also be obvious to the experienced eye. The less expensive the ivory, the coarser and more noticeable the grain. Look for ivories that are close enough in grain that they don't stand out as obvious replacements. The keytop on the left has original ivory with a coarser grain. The replacement keytop on the right is a finer grain. The difference, however, is not so much as to draw the eye.*



*Finally, keytops often have important dimensional differences with noticeable variations in length, width and thickness. Edging treatments may also differ. In searching for ivories to fill in missing spots, look for keytops that are at least as long, as wide, and as thick as the originals. Excess ivory may be removed by sanding, but a keytop that is too short, too narrow, or too thin will draw the eye as an obvious substitution.*



*Hint: In order to replace ivory keytops, it is helpful to have your collection of used ivories cleaned and sorted by note. C's and F's, though not identical, are close enough to be stored together. The same goes for B's and E's. D's, A's and G's all are distinct. For replacing a C8, you will need an ivory with no filing marks. Obviously, the larger your collection of ivory, the better your chances at finding good matches that will blend in.*



**Step 5:** At this point, sort through your collection of ivories to find the closest matches possible. Here's where having your ivory sorted will pay off. If a B or F key were needed, for example, looking through this assortment, which are all polished B's or F's, would be more fruitful and much less time consuming than trying to sort a large, dirty collection of miscellaneous ivories.



*Hint: Sometimes the hardest ivories to match are the extra-long ones - those close to 2" in length. Ivories that have a length of 1 7/8" are common. Those that are 1 15/16" or even 2" are harder to find. If you have lots of ivory, the quickest way to pick out the longest ones is to put them in a tray on-end, and look for the ones that stand out. Keep those to use just where they are needed - don't sacrifice a long ivory when a shorter one would do just as well.*



**2nd Advisory Caution:**

*Before proceeding, another decision must be made. Should one simply glue on replacement ivories to fill in the gaps, or would it be advantageous to remove all the ivories for regluing? If a number of ivories have dropped off already on their own, and others pop off easily (photo on left) chances are more will follow. It may make sense to advise total removal and regluing of all the heads, or even all the heads and tails, to avoid problems down the road.*



**Step 6:** If removal of old keytops is necessary, place a damp, absorbent cloth over the top of the ivory to be removed, and heat with an iron on a medium setting for about 30 seconds, or until the cloth quits steaming.

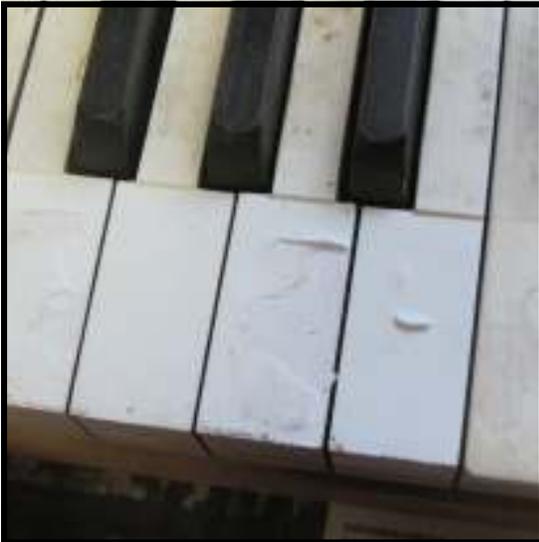
*Caution: For the time being, leave the tails in place, even if the intention is to reglue them all as well. The front-to-back positioning of the heads will be simpler with the tails still in place. For now, avoid steaming or loosening them.*



**Step 7:** Carefully remove the ivory by prying up with a narrow putty knife. Start from the front of the key by gently pushing the overhang up, then work the blade of the putty knife between the ivory and the fabric backing cloth or the wood of the key. By working the putty knife back and forth and pushing it towards the tail, most keys will come loose. If the keytop refuses to come completely loose, try reheating with the damp rag and iron, then repeat the process.



**Step 8:** If you are regluing the entire set of ivory fronts, use a holder to keep the keytops in order from A0 to C8. The homemade holder pictured is simple to make, consisting simply of a 2" x 2" cut on a diagonal with slots every 3/4". The slots may be then labeled starting with A0 and ending with C8.



**Step 9:** With the ivory heads removed, the keystick itself will need further preparation. In many vintage pianos a linen backing was used between the ivory and the keystick. Before the ivories are reglued, this backing needs to be removed, even if the fabric is in perfect condition. Leaving the fabric on would result in the keytop being too high in comparison to the tail.



**Step 10:** For keys with a linen backing, first slice the fabric with a sharp razor along the front edge of the tail.



**Step 11:** Heat the backing up with a damp rag and your iron set on a medium setting. Experiment to see how much heating is required to loosen the fabric from the keystick.

*Caution: Avoid generating so much steam in the process that the key bushings are adversely affected! Check them often for signs of looseness and adjust your procedure accordingly.*



**Step 12:** Carefully peel the softened backing from the keystick, trying not to tear it as it is pulled away from the wood.



**Step 13:** Using a chisel, scrape off any remaining adhesive. *You do not need to be completely down to bare wood, but the wood should be showing through.*



*Note: On some pianos the procedure of removing loose ivory in preparation for regluing will proceed rapidly, leaving you with the keyset in the condition shown in the photo on the left. Other times, unfortunately, removal of bad keytops may be complicated by previous attempts to glue missing ivory onto the keysticks. All sorts of adhesives will be used by the amateur repair person. Take your time to avoid making a bad situation worse.*



**Step 14:** Some adhesives will not loosen noticeably with the application of steam or heat. A sharp wood chisel will at times be more effective in prying the old ivory off than a putty knife. Swivel the sharp edge of the blade as you push towards the tail. Try rocking the chisel slightly to pry the ivory off.

*Caution: Notice that the flat side of the chisel is towards the wood. Be careful that you do not start to remove wood from the keytop. Proceed cautiously!*



*Note: With the ivory keytop finally off, it is obvious that the keystick pictured would need more attention than normal to bring it up to the desired condition. The adhesive remaining in this situation proved to be very difficult to remove. Additionally, a chunk of wood from the top of the keystick adhered to the underside of the ivory.*



**Step 15:** For adhesive of such tenacious nature, try a direct application of heat to soften the substance, but don't be surprised if this is ineffective. (Be sure to cover your iron with foil to avoid a transference of the adhesive from the keystick to the surface of the iron.)



**Step 16:** Again try using a sharpened chisel. Instead of scraping the adhesive off, it is some times more effective to slice it off. Keep the flat side of the chisel flush with the top of the keystick, and swivel it back and forth across the surface to remove as much of the substance as possible. Again, be cautious not to remove wood from the keystick itself.



**Step 17:** Finish by cleaning off any remaining residue with sandpaper. Use 100 or 150 grit paper turned grit side up on your bench.

*Caution: Keep the keystick as flat to the paper as possible as you work it front to back. Check the surface of the keystick frequently to avoid over-sanding.*



**Step 18:** At this point, ascertain the condition of the keystick. A bit of roughness is tolerable, but a missing chunk of wood such as is visible in the photo (notice the key is turned side-ways), needs to be filled.



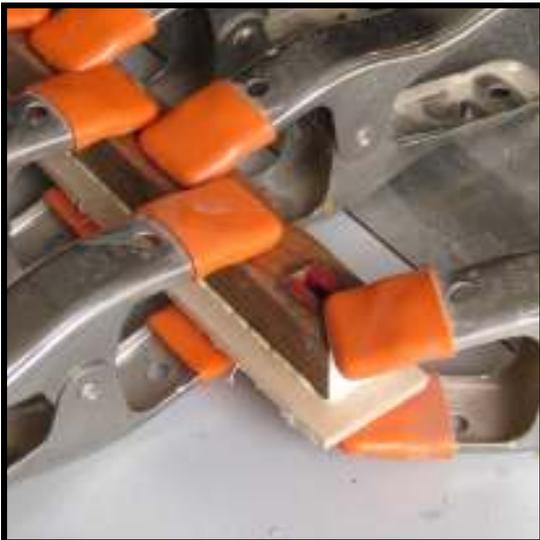
**Step 19:** For small gouges and divots, a commercial wood filler will do the job. Apply with a little overfill, and allow to dry completely.



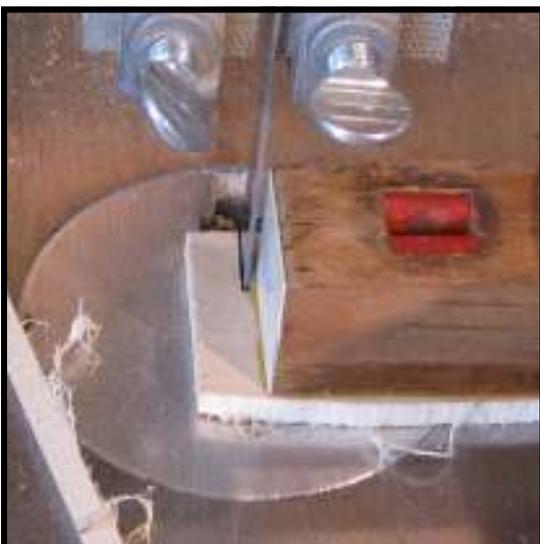
**Step 20:** Once the filler is dry, repeat sanding as in step 17, then reexamine the surface. If an indentation is still noticeable, apply a second application of wood filler and resand.



**Step 21:** For keysticks with a large amount of surface damage, it is sometimes advantageous to remove the top layer of wood altogether for replacement with a cap of basswood. To perform this procedure, first remove the ivory tail from the keystick. Use a table saw to cut off the damaged layer of wood. Cut off enough so that the resulting cap will be a solid piece of wood thick enough to work with and not just a thin layer of veneer.



**Step 22:** Glue an oversize basswood cap on the keystick with Titebond Wood Glue using key spring clamps to clamp, then allow to dry overnight.



**Step 23:** Use your band saw to trim the cap nearly flush with the sides. Leave a bit of excess to plane or sand down, so that you're not biting into the original wood of the keystick with the blade of the band saw.



**Step 24:** Use your table saw to trim off excess thickness. (Before cutting, adjust the fence on the saw using the thickness of an adjacent note. Snug the fence up so that the key fits loosely between the saw blade [not turning, obviously] and the side of the fence.)



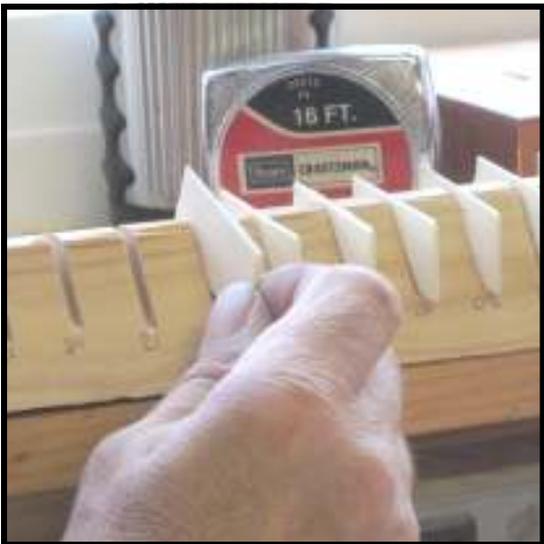
**Step 25:** Finish the procedure by using a small block plane (Cat. No. MF-33) to shave off the bulk of the excess, then by sanding the sides of the cap flush with the original keystick. (*Note: Refer to catalog for picture of actual plane.*)



**Step 26:** Once all of the keysticks are prepared (if you are in fact regluing all the keytops), turn your attention to the ivories. Make sure that the set of ivories is complete, with all missing keytops filled in with acceptable substitutes from your collection of used ivory .



**Step 27:** Prepare a work surface for cleaning and preparing the ivory. The arrangement shown in the photo, with a small composite cutting board outfitted with an end-stop works well. Screw or clamp it to your bench top to prevent shifting as you work. A quarter sheet of 150 grit and 220 grit will be needed as well.



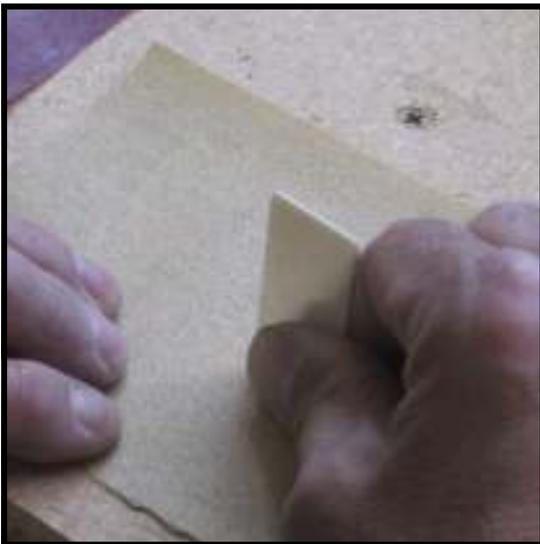
**Step 28:** As you work along the keyset, double check each ivory by looking at the back edge of the ivory to make sure that you have the right keytop for the key. Have the keytop holder placed where it will not be accidentally bumped.



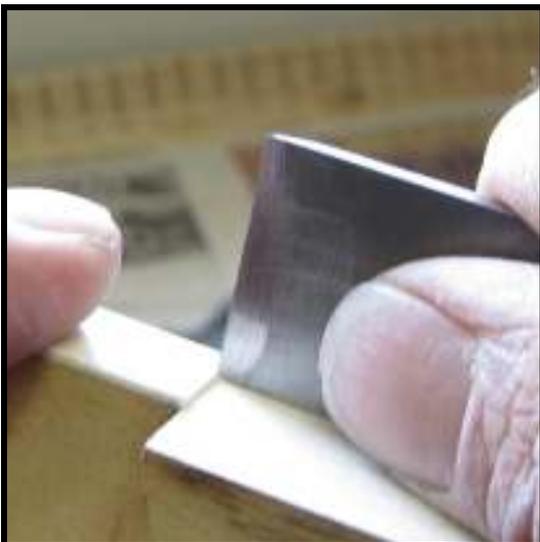
**Step 29:** Prepare each keytop as you go by scraping the underside of the ivory with a sharp chisel to remove old glue, linen or particles of wood.



**Step 30:** Once the underside of the ivory has been scraped, turn the key over and sand with a coarse (100 or 150 grit) sandpaper. It is best if the gluing surface of the ivory be slightly roughed up and not too smooth, to guarantee a better glue joint between the ivory and the keystick. Sand one half of the ivory, then flip it around and sand the other half.



**Step 31:** Clean the rear edge of the keytop by pushing it several times over fine sandpaper (220, then 400 grit) which is on a flat surface. As you do this, firmly hold the keytop at a slight angle toward the underneath side of the keytop. The purpose of this is to end up with an ever-so-slight bevel so that the top surface of the back of the key fits tightly with the tail ivory at the seam between the two pieces.



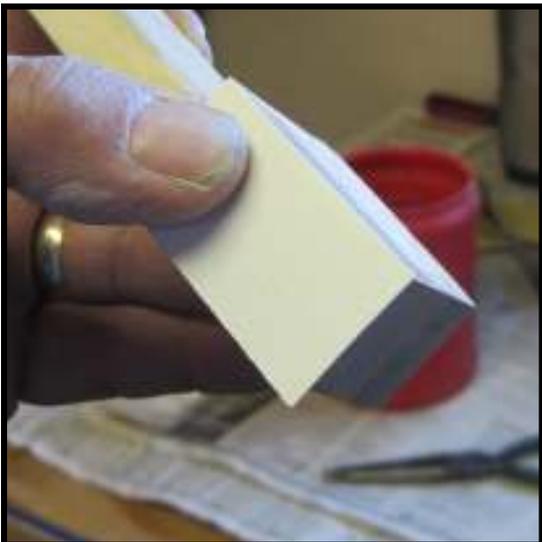
**Step 32:** Use a sharp chisel with squared edges to clean out along the tail.

*Caution: As you scrape along the tail, keep the edge of the chisel flat to the surface of the key, otherwise the blade will be scrapping away at the top edge of the tail, which is not what you want for a tight seam between the head and the tail.*



**Step 33:** Test the fit. The head and the tail should mate together with a nearly imperceptible seam. If not, try a bit more scraping and sanding.

*Caution: Be very patient here, in that going too far (especially in sanding the rear edge of the head) may result in a keytop which is short in comparison with its neighboring keys.*

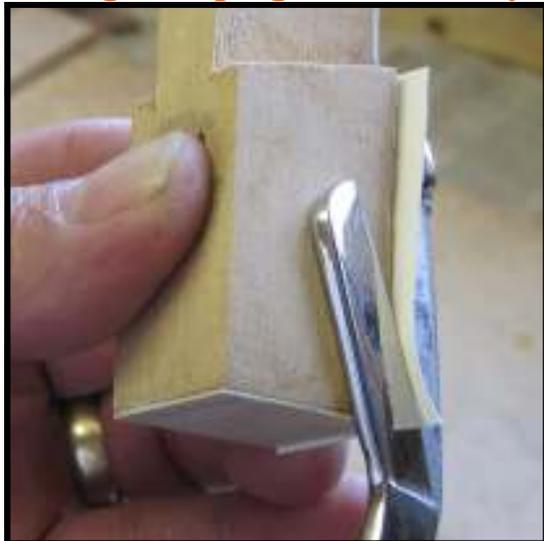


**Step 34:** Set the head piece aside for the moment and line up an ivory cement wafer with the top of the keystick, so that the right hand edge of the wafer is flush with the side of the keystick, and so that the back of the wafer is butted up against the ivory tail.

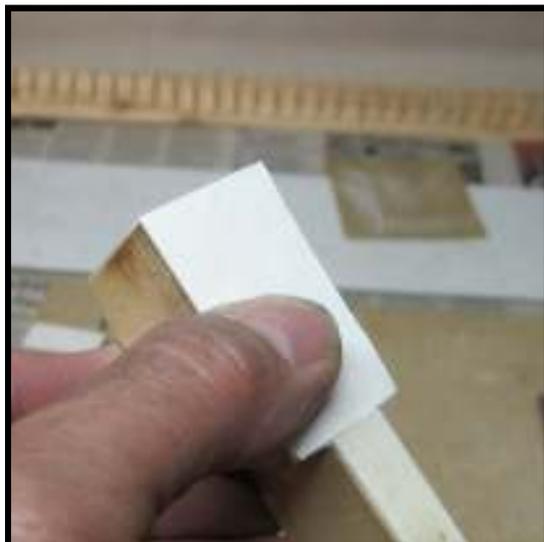


**Step 35:** Carefully turn the key over without disturbing the positioning of the gluing wafer. The excess on the front and side of the wafer needs to be trimmed away.

*Note: Without trimming off this extra material, it is difficult to gauge where the edge of the ivory is in relation to the side of the keystick when the clamp is being applied.*



**Step 36:** Hold your curved nose scissors so that you cut the excess fabric of the wafer along the side of the keystick. It is important that the inside edge of the scissor run along the wood of the keystick, as shown. Once you've done the side, trim the front edge as well.



**Step 37:** Turn the key back over again to make sure that the positioning was maintained, and that the wafer covers the entire surface of the top of the head of the keystick without any excess hanging over the side.



**Step 38:** Before going any further, position a watch or a timer within easy viewing range.



**Step 39:** Have your set of key spring clamps ready to use. Either two or three clamps per note will be required, depending on the method used. Both methods will be explained.



**Step 40:** Fill a container with clean water (don't use the same water you've been steaming ivory with). Have a pair of needle nose pliers ready to use.



**Step 41:** Finally, position your shop iron flat-side up in a bench vise turned on to a medium heat. Have a supply of brass head plates in close proximity to the iron.



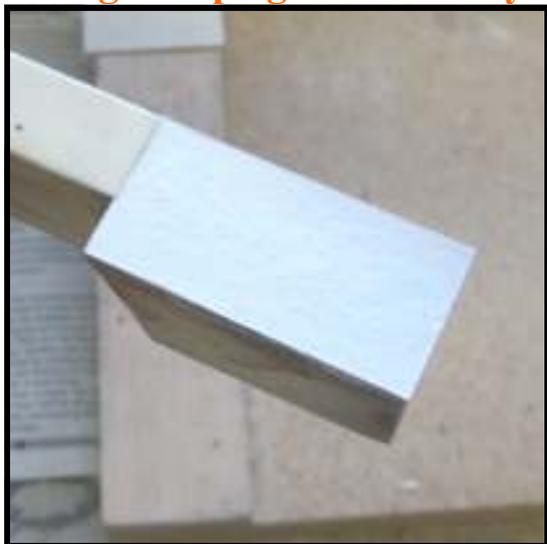
**Step 42:** With all the preparations made, insert the trimmed wafer into the container of water, holding the wafer with the tip of the needle nose pliers and waving it gently back and forth in the water. Keep an eye on your timer or watch, leaving the wafer in the water for approximately 30 seconds.



**Step 43:** After 30 seconds, remove the wafer from the water and tap off any excess.



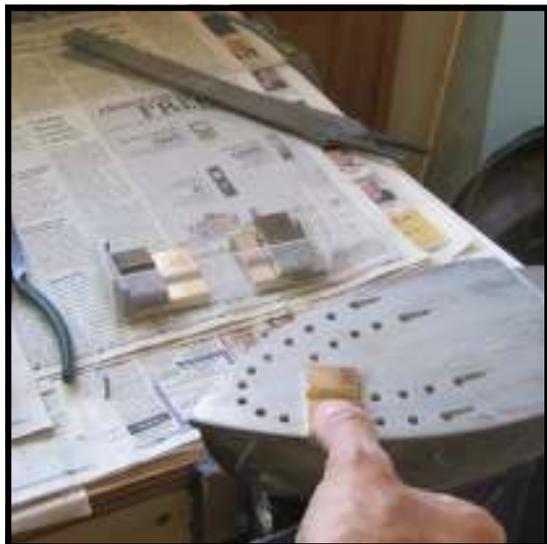
**Step 44:** Apply the wafer to the top of the keystick, making sure that it's up tight against the seam between the front and the tail.



**Step 45:** Examine the wafer to make sure it is covering the wood entirely, and that it has no wrinkles.



**Step 46:** Place the correct ivory keytop (make sure!!) on top of the wafer, pushing it up firmly against the seam.



**Step 47:** Heat the head plate by placing it on the surface of the iron for approximately ten seconds. Brush your thumb against the brass of the head plate as it heats to test for the correct temperature. It should be hot, but not so intensely hot that you can't pick it up for a few brief moments with your fingers.



**Alternative method:**

If working on a piano in the field, it may be more convenient to simply heat the brass head plate with an alcohol lamp. Again, carefully touch the brass from time to time to check the temperature. This method will take a bit longer than using an iron. Apply heat to the side which goes away from the ivory.



**Step 48:** Quickly place the heated head plate over the ivory, with the lip of the plate butted up against the front edge of the keytop. Make sure that the ivory is still aligned from side to side, with no portion of the ivory hanging over on either side.



**Step 49:** Holding the back of the plate down with the thumb of your left hand, (it should still feel very hot) quickly apply a key spring clamp to the front of the key, slightly back from the very front of the key. Tilt the clamp slightly as you apply it so that the bottom jaw is slightly further back than the top jaw. (This will help prevent the ivory from pulling away from the seam between the front and the tail.)



**Step 50:** Apply a second clamp as shown, this time tilting it slightly from side to side so that the bottom jaw is again further back than the top jaw.



**Step 51:** Examine the ivory from the side to make sure that the back of the keytop has not lopped over the top of the front edge of the tail. Make sure also that the ivory has not slid slightly from side to side, leaving a portion of one side of the key uncovered, while the opposite side has an excess of ivory hanging over.



**Step 52:** If any error in positioning is discovered, remove the clamps, quickly reheat the brass plate, then reclamp with whatever corrections are necessary.

*Note: Correct positioning is a real headache if one doesn't trim the cement wafers. As shown on the left, one never is quite sure of where the edge of the ivory meets the edge of the keystick.*

*Another procedural question might be raised as to why heating the plates is necessary. Experimentation shows why.*

## Is heating the brass plate really a necessary step?



Knowing that many technicians would be disinclined to just take my word for this, I spent the better part of a day testing to verify the importance of this step. I built the device on the left to measure the adhesion of keytops which had been recovered using both cold and hot brass plates. I also tested various time periods for letting the glue set, to see if that made a difference as well.

*Note: I really don't remember where I learned to clamp ivories using heated plates, (I could have read about it, been shown it at a meeting, or just figured it out on my own - at this point I have no idea), but I've know that it always has seemed correct to me. Putting it to the test seemed the right thing to do. **For one thing, if it did turn out to be unnecessary, I could quit burning my fingers!***

The testing device consisted of a support for a keytop to be firmly clamped upside down with an open space underneath the ivory. A wooden wedge was placed on the overhanging lip of the ivory so that incremental amounts of weight could be applied to the overhang until the glue joint failed and the ivory popped off. A support attached to the top of the wedge held a container for water to add weight. So far, so good.



Using six old keys, I glued on ivories with ivory cement wafers using identical methods, except that for three of the ivories I used cold brass plates, and for the other three, heated plates. To avoid mix-ups in the process, I labeled the side of each key to label the process used and the starting and ending times.



At each timed interval (1 hr., 4 hrs. and 8 hrs.) ivories using both the cold plate and hot plate were put to the test. The difference was amazing.

At one hour, the cold plate ivory let loose when nothing but the empty pitcher (weighing 0.5 pound) was placed on the platform! (It looked loose before I even put it in the holder.) With the hot plate ivory, however, I filled the

entire pitcher with water. Nothing happened, so I emptied the pitcher, put a 8 pound telescope weight on top of it, then began filling again. The ivory didn't let loose until the pitcher was over half full. In all, it took 17 pounds of weight to break it free! *(Thinking this might be a fluke, I did a second test hour test (both hot and cold) same day, with nearly identical results.)*

At the 4 hour mark and the 8 hour mark, I again performed the tests. The cold plate tests did go up to 4 pounds at 4 hours, and 5 pounds at 8. With the hot plate tests, the performance was the same at 4 hours (17 pounds), but went clear up to 21 pounds at 8 hours. **In all, it took the full pitcher of water, the 8 pound telescope weight and a plastic bag full of sand to break the ivory free!**



The upshot of all of this is that, unless I'm missing something here, using cement wafers in combination with brass plates works well if the plates are heated, but not well at all if the plates are cold, especially when used for shorter times. By heating the plates, good adhesion is achieved after as short of time as an hour. Thus, the procedure would be feasible in the field, if done before a tuning.



**Step 53:** Once the clamps have been applied to each key, set the assembly aside for the glue to cure. If you have a limited number of clamps, I would recommend working until you run out, then leaving everything clamped up at least an hour before continuing. Ideally, a set of either 104 clamps, or 156 clamps (for 3 to a note) would allow you to finish the entire set, then leave all 52 notes clamped to cure overnight.



**Step 54:** When the clamps come off, you should find that the ivory has bonded solidly to the keystick. Any glue which has extruded from the joint will be hard to the touch and sandable.



**Step 55:** This is what you hope not to see. An ivory has shifted position after the clamps were applied, leaving a portion of exposed. Don't be tempted to sand the side of the keystick flush with the ivory, as that will leave too wide of a gap between the keys. Better to bite the bullet, reheat and remove the ivory (and it will be harder this time) and start over.

*Note: if you're equipped to use three clamps per note, and can do just a bit of micro-woodworking, there is a way to avoid having this happen.. Read on.*



**Alternative repair method:**

**I.** Cut miniature side restraints out of pine. Each restraint should be approximately 1/2" wide, and as long as the keys are high. The overhanging lip is important to have.



**II.** Have the restraints clamped in place before placing on the wafer and the ivory. With the overhanging lip of the restraints held in place at the bottom of the key, the top of the restraints should be cut so that the top edge sits just below the top surface of the ivory.

*Caution: If the restraints are cut too high, they may interfere with positioning of the brass plates.*



**III.** With the restraints clamped in place, position the wafer and the ivory, then finish clamping using the ordinary procedure. The restraints should be left on until there is no danger of the ivory shifting (5 minutes should suffice), then they may be removed to use on another key.



**Step 56:** Using sandpaper with a sanding block, remove the excess glue and any discoloration on the sides of the keys. Start with 100 grit paper and finish with 150 or 220 grit.



**Step 57:** Next, place the keytop in your vise to clean the front. Use 0000 steel wool if only a light cleaning is necessary. If heavy cleaning is needed, start with 400 grit paper, followed by steel wool.



**Step 58:** Check the joint between the head and the tail for unevenness in height. A discernible difference in thickness will mean that either the head or the tail will need to be sanded down flush.



**Step 59:** Obtain sandpaper in the grits shown. Automotive supply stores usually carry fine grits with their finishing supplies.

*Caution: Use of grits coarser than around 400 will result in scratches that require a lot of extra sanding to remove. 220 sandpaper, a popular grit for woodworking, is really too coarse to be using on ivory.*



**Step 60:** Place the grits of sandpaper you are going to use face up on your bench, and sand the ivory by holding the keystick face down as shown. If unevenness between the head and tail exist, start with 400 or 500 grit, and sand until the joint is smooth. Then switch to the 800 grit paper to remove the sanding marks of the coarser paper.



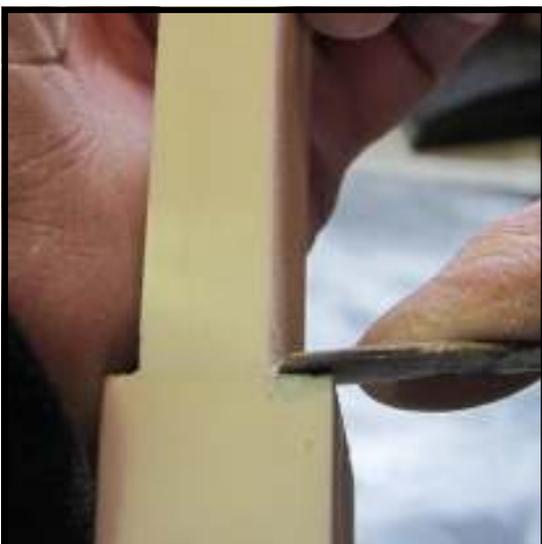
**Step 61:** Check your progress at the juncture between the head and the tail frequently to avoid over-sanding. In the photo to the left, the ivory powder which has caked to the left of the tail indicates that the tail is still a trifle high compared with the back of the head. Also, the portion of the head butted up to the tail appears as if it has not to this point been touched by the sandpaper. A bit more careful sanding is in order.



*Note: Here the seam is smooth. The joint between the head and tail is no longer discernible to the touch, and is barely visible to the eye.*



**Step 62:** A final sanding of the ivory is done with 1000 grit paper. This step should be done by hand to insure that no spot is missed.



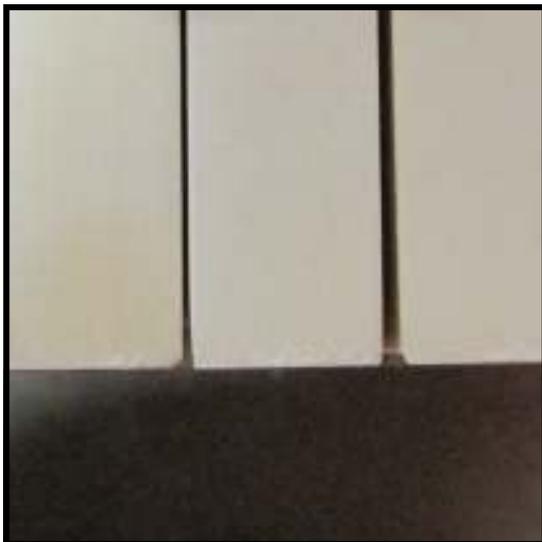
**Step 63:** Use a small chisel or carving tool to clean out hardened glue and ivory powder from the notches for the sharps. Scrape the notch even with the wood of the keystick.



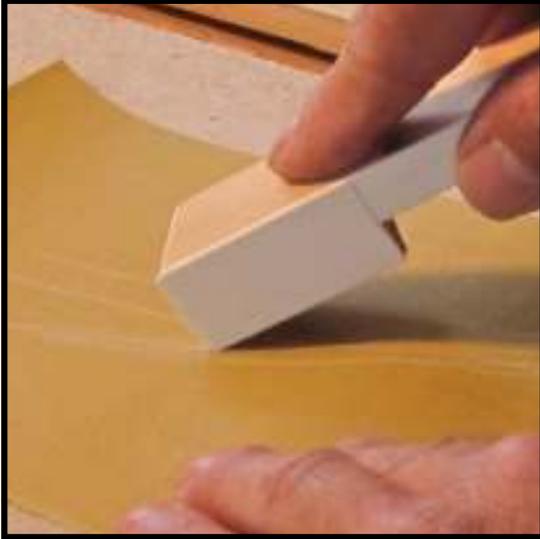
**Step 64:** Reinstall the keys in the key-frame as you go. Unless you had perfect matches length-wise, you'll probably have some stand-outs that need attention. Both the length of the overhang and the amount of rounding on the corners of each keytop should be the same



**Step 65:** Use a 11" piece of 2" x 2" lumber as a sanding block to even out the front edges of the keytops. Work back and forth across the keyset, checking your progress frequently to avoid taking off more ivory than absolutely necessary. Once the stand-outs are even with the surrounding keytops, quit.



*Hint: By eye-balling the fronts of the keys as you go, you can avoid over-sanding. As you get close to an even line of keytops, check with a straight edge.*

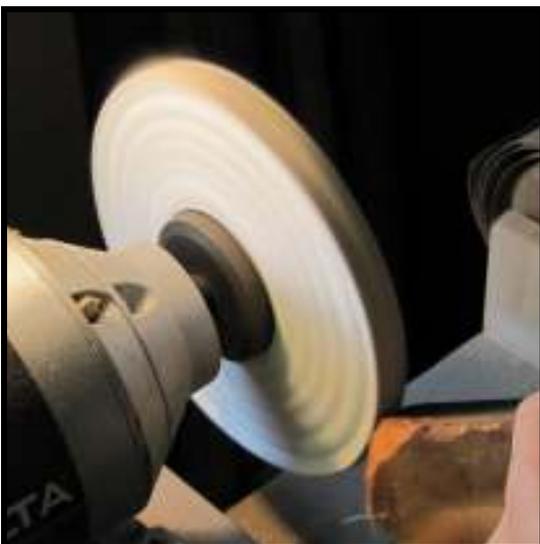


**Step 66:** Round off any squared-off corners by dragging key in a rotating motion over a sheet of 220, then 400 grit sandpaper.

*Caution: Again, go easy and check progress often, as you can always take more off, but you can't put it back on!*



**Step 67:** Round the front edges of the keytops with a sheet of 400 grit paper on a sanding block. Use easy strokes, rotating the block slightly on each stroke. Work back and forth across the keyset until a even, gentle rounding is obtained. Follow this up with several swipes of 600 grit.



**Step 68:** With your final shaping of the ivory complete, it is time for polishing. Start by loading your dedicated polishing wheel with Tripoli bar polish. Set your grinder on its lowest speed. As you work, occasionally rake your wheel clean with a flat-bladed screwdriver and refreshen with polish.



**Step 69:** Using a light touch, run the keytop at a moderate pace back and forth across the surface of the wheel. Two or three passes usually is enough.

*Caution: Be very careful not to over-heat the ivory by dwelling on one spot for too long. The notch at the sharp can be a potential trouble spot if you're not careful. Also be very sure to maintain a firm grip on the keystick, or it's liable to go zinging out of your hand to the floor with disastrous results!*



**Step 70:** Hold the key up to see the reflection from a window or overhead light. The surface should appear glass-like in appearance without visible scratches. If small defects are noticed, go back to sanding out the surface with 800, then 1000 grit of paper. Rebuff on the wheel and check in the light again.



**Final note:** If tails are loose, or if the set of tails is to be reglued, the procedures are the same from start to finish. Matching is easier, in that you don't have notching to take into account, plus most people who replace keytops with plastic will have cigar boxes full of tails to choose from. The only difficulty is clamping so that the ivory doesn't shift. Try a set of four clamps, as shown on the left, to prevent slippage. Use the brass tail plate.



### Chasing an Illusion . . .

Absolute perfection in this type of restoration work is an impossibility, at least in my opinion. Unless one has a full set of keytops from the same piano to work with (in other words keytops cut from the tusk of one elephant), there are going to be mismatches in ivory. There are just too many variables in grain and shading to find absolutely perfect matches in keytops, even when one is working with a large collection of used ivory.

That's not to say one shouldn't do his best to try for perfection. By carefully choosing replacement ivories, then applying, shaping and polishing the keytops with skill, a set of keytops can be restored to a beautiful condition. In the dozen keys from C5 to G6 in the photo above, for example, there are four replacement ivories not original to the piano. That they are difficult to pick out without close examination is the whole point of learning the proper set of procedures needed to do this repair.

A beautiful set of genuine ivory keytops on a piano is pleasing to the eye and to the touch. Learning to achieve such beauty is a skill worth having.

Notes on Procedures